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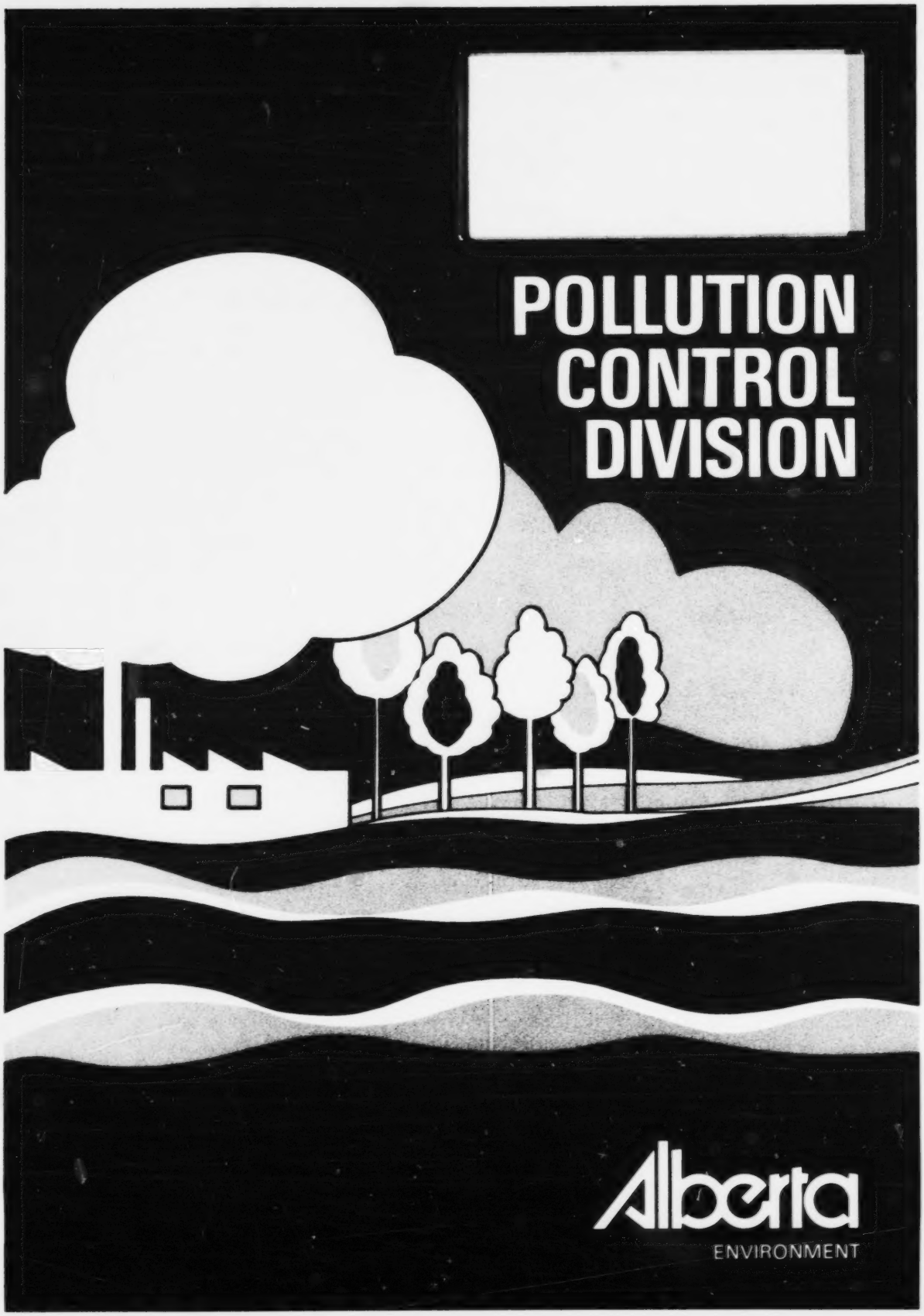
POLLUTION CONTROL DIVISION



Alberta
ENVIRONMENT

NISKU INDUSTRIAL PARK
PCB STORAGE FACILITY
SAMPLING PROGRAM

Alberta Environment
Pollution Control Division
Waste Management Branch
January, 1983

INTRODUCTION

On January 13, 1983, an allegation was made that polychlorinated biphenyls (PCBs) were leaking from the Kinetic Ecological Resource Group (1982) Ltd. facility at 1204 - 1208 8A Street, Nisku. The report was based on two samples, one taken from the ditch to the immediate east of the facility (reported PCB concentration 5 ppm) and the other taken from inside the fenced property (reported PCB concentration 2,000 ppm).

Upon receipt of this information, Alberta Environment dispatched personnel to sample the immediate vicinity of the site on the evening of January 13 and downstream of the site on January 14. Additional samples were taken on January 17.

The purpose of the sampling and analysis was to determine whether there was PCB contamination and leakage from the site. PCBs are non-reactive stable substances which have been used as electric transformer coolant fluids. They are persistant in the environment and must be controlled in use and disposal.

Canadian government guidelines set 50 parts per million (ppm) and above as the level for PCB contamination. (See Appendix I). Any material with less than five ppm is considered free of PCBs for all purposes except human consumption.

In Alberta, the storage and handling of hazardous chemicals such as PCBs are governed by the Hazardous Chemicals Act. The Act gives the Minister of Environment the authority to take whatever action is necessary to ensure proper handling, storage and disposal of hazardous chemicals. Under the legislation, Alberta Environment may issue a control order to a company if there is evidence of improper procedures. A control order would require a company to clean up contaminated areas and improve procedures and/or facilities.

SAMPLING AND TESTING PROCEDURES

An expert sampling team,comprised of A. Leander, T. Trimble and S. Livingstone of the Pollution Control Division was formed to obtain the necessary samples. Sampling involved the following procedures:

1. Site Inspection
   - a general survey of the area resulted in the selection of a representative location for taking samples.
2. Sample Location Selection and Sampling

   Soil/Sediment/Ice samples - a specific location is selected based on topography - low lying areas and depressions are preferred. Snow and debris are removed, the soil is loosened with a clean chisel/ice pick and a sample is scooped into the glass container.

   Water samples - a specific site is located based on water flow. A hole is made in the ice with a clean ice pick, the debris removed and a sample dipped out.

Samples were placed in either new glass jars or laboratory cleaned glass bottles. The container was then sealed with aluminum foil and the lid screwed on. Pertinent information was then written directly onto the container label.

Nine samples were taken on the night of Thursday, January 13, 1983, in the vicinity of Kinetic Ecological Resource Group storage facility. Figure I shows the sampling locations.

The initial set of samples were taken to establish a background level (Samples 1 and 6) and to determine if PCBs had escaped into the stormwater drainage system (Samples 2, 3 and 4). Samples were also taken within the Kinetic compound (sample 7, 8 and 9) to establish the degree of on-site contamination.

Sampling was continued on Friday, January 14. The stormwater drainage system within Nisku Industrial Park, downstream from the Kinetic Ecological Resource Group site to the discharge into Blackmud Creek, was sampled (Figure II, Samples 10, 11, 12, 13, 14 and 15). The drainage system comprising Blackmud Creek - Whitemud Creek - North Saskatchewan River was also sampled (Figure II, Sample 16; Figure III, Samples 17, 18, 19, 20 and 21).

Samples were also taken in and around the site of another PCB disposal firm, D & D Group (Figure II, Samples 22, 23 and 24).

The samples collected Thursday and Friday were analyzed on the weekend by the Alberta Environmental Centre, Vegreville. Based on these results, a further sampling was carried out on the Kinetic Ecological Resource Group site (Samples 25, 26, 27, 28, 29, 30 and 31). In addition, a water sample was taken from the discharge of the Nisku Industrial Park sewage lagoon (Sample 32). A soil sample was taken in Edmonton (50 Street and 13 Avenue, Sample 33) to establish a background level.

Table I is a summary of all the samples taken, type of sample, sample location and reason for sampling.

RESULTS

All the samples were analyzed by the Chemistry Section of the Alberta Environmental Centre, Vegreville for PCB concentration. The analytical results are shown in Table II. The samples can be divided into three broad categories:

On-site samples: 7, 8, 9, 25, 31 (Kinetic)
22 (D & D Group)

Drainage Samples: 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 15, 23, 24

Water Course Samples: 16, 17, 18, 19, 20 ,21, 32

Two general background samples were taken: a soil sample from 50 Street and 13 Avenue, which had less than 0.025 ppm; and a City of Edmonton drinking water sample, which had less than 0.000005 ppm (i.e. not detectable).

The on-site asphalt samples at Kinetic ranged from 5 ppm to 0.325 ppm. The sample that had the high reading was taken from a high usage area in the compound. Sample 7 also had a water component which was analyzed separately and contained less than 0.000065 ppm PCBs. The on-site D & D Group Sample (Sample 22) contained less than 0.025 ppm PCBs.

The drainage system samples were all taken from the Nisku Industrial Park stormwater drainage system. The samples can be subdivided into those taken in the immediate area of a facility (Samples 1, 2, 3, 4, 5, 6, 7 ,8, 9, 25, 26, 27, 28, 29, 30, 31 in the immediate vicinity of Kinetic Ecological Resource Group and Samples 23 and 24 in the immediate vicinity of D. & D Group) and those taken downstream from the facilities (Samples 10, 11, 12, 13, 14, 15, 23, 25). In the immediate vicinity of the facilities, the background samples (upstream Samples 1, 6, 23) contained less than 0.030 ppm PCBs.

In the vicinity of Kinetic Ecological Resource Group (Samples 2, 3, 4, 5, 6, 26, 27, 28, 29, 30) traces of PCBs in the range less than 0.03 to 1.0 ppm were evident. The sample from the D & D Group site (Sample 24) showed less than 0.025 ppm PCBs.

The PCB level in the sediments or in the water of all water course samples (except Sample 32) was not detectable. Sample 32 was taken at the sewage treatment pond outlet and contained 0.00077 ppm PCBs.

CONCLUSION

Levels of PCBs of up to 5.0 ppm were detected on the asphalt pad within the working compound of Kinetic Ecological Resource Group. Since this area is used for the transfer and handling of PCB material, it is assumed that the pad could have received some PCB spillage in the past. Because of the chemical properties of PCB, the material is dissolved into asphalt and cannot be removed easily. Therefore, it is concluded that if a spill occurred, it could have been cleaned up leaving only the residue dissolved in the asphalt. PCB levels are not above those which would be expected in a handling facility for PCBs.

The drainage ditches next to the site show PCB levels from 0.24 to 1.0 ppm. These trace amounts are well below the Federal Guidelines of 50 ppm for contaminated material.

All of the samples of water and soil from the water courses downstream from the site showed no detectable levels of PCB. In addition an independent study "Chemical Residues in Fish Tissues, Part III on the North Saskatchewan and Red Deer Rivers "by Dr. J.W. Moore, Alberta Environmental Centre, Vegreville, confirms the absence of PCB contamination in the North Saskatchewan River. Therefore, it is concluded that no leakage is evident and no danger to the public exists.

The Waste Management Branch, Division of Pollution Control will continue to monitor the site and surrounding area to ensure the maintenance of containment and security.

Table I

Sample #	Type	Sample Location	Reason for Sampling
1	sediment	ditch upstream from KERG	establish local background levels
2	- " -	ditch in front of KERG	check for contamination
3	- " -	- " -	- " -
4	- " -	- " -	- " -
5	- " -	- " -	- " -
6	- " -	ditch upstream from road	establish local background culvert levels
7	asphalt	KERG yard in front of	check for PCB contamination in yard
7	ice	warehouse doors	check for PCB transmitted by forklift
8	asphalt	KERG yard near cement pool	check yard for contamination
9	- " -	KERG yard at north gate	- " -
10	sediment	culvert under road	check for stormwater system contamination
11	ice	north drainage ditch	- " -
12	sediment	- " -	- " -
13	- " -	main drainage ditch	- " -
14	- " -	stormwater runoff pond inlet	- " -
15	- " -	stormwater runoff pond outlet	- " -
16	water	Blackmud Creek & Hwy. 625	check for drainage system contamination
17	- " -	Whitemud Creek downstream	- " -
18	sediment	from confluence with Blackmud	
19	- " -	Blackmud upstream from confluence	- " -
20	- " -	Whitemud upsteam from confluence	establish background levels
21	- " -	NSR downstream from confluence	check for water contamination
22	soil	D & D yard back fence	check for contamination
23	sediment	upstream from D & D yard	establish background levels
24	- " -	downstream from D & D yard	check for contamination
25	asphalt	KERG yard near cement pond	- " -
26	sediment	south end, second culvert	- " -
27	- " -	north end, second culvert	- " -
28	- " -	south end, third culvert	- " -
29	- " t	north end, third culvert	- " -
30	- " -	ditch in front of KERG	check for contamination and as a control for lab
31	asphalt	west side of yard	check for contamination
32	ice	Nisku Park lagoon	- " -
33	soil	50 St & 13 Ave. Edmonton	establish local background levels
34	water	Oxbridge Place	- " -

Table II

Sample #	Sample Type	RESULTS Parts Per Trillion (PPT) (Nanograms Per Litre)	Parts Per Billion (PPB) (Nanograms Per Gram)	Parts Per Million (PPM) (Micrograms Per Gram)
1	sediment		<30	<0.030
2	sediment		330	0.33
3	sediment		880	0.88
4	sediment		260	0.26
5	sediment		240	0.24
6	sediment		<30	<0.030
7	asphalt		780	0.78
7	ice	<65		<0.000065
8	asphalt		5000	5.0
9	asphalt		2500	2.5
10	sediment		<25	<0.025
11	ice	<58		<0.000058
12	sediment		<25	<0.025
13	sediment		<25	<0.025
14	sediment		<25	<0.025
15	sediment		<25	<0.025
16	water	<30		<0.000030
17	water	<30		<0.000030
18	sediment		<25	<0.025
19	water	<30		<0.000030
20	water	<30		<0.000030
21	------	sample destroyed	---------	
22	soil		<25	<0.025
23	sediment		<25	<0.025
24	sediment		<25	<0.025
25	asphalt		3200	3.2
26	sediment		1000	1.0
27	sediment		300	0.30
28	sediment		600	0.60
29	sediment		350	0.35
30	sediment		370	0.37
31	asphalt		325	0.325
32	ice	770		0.00077
33	soil		<25	<0.025
34	water	5		<0.000005

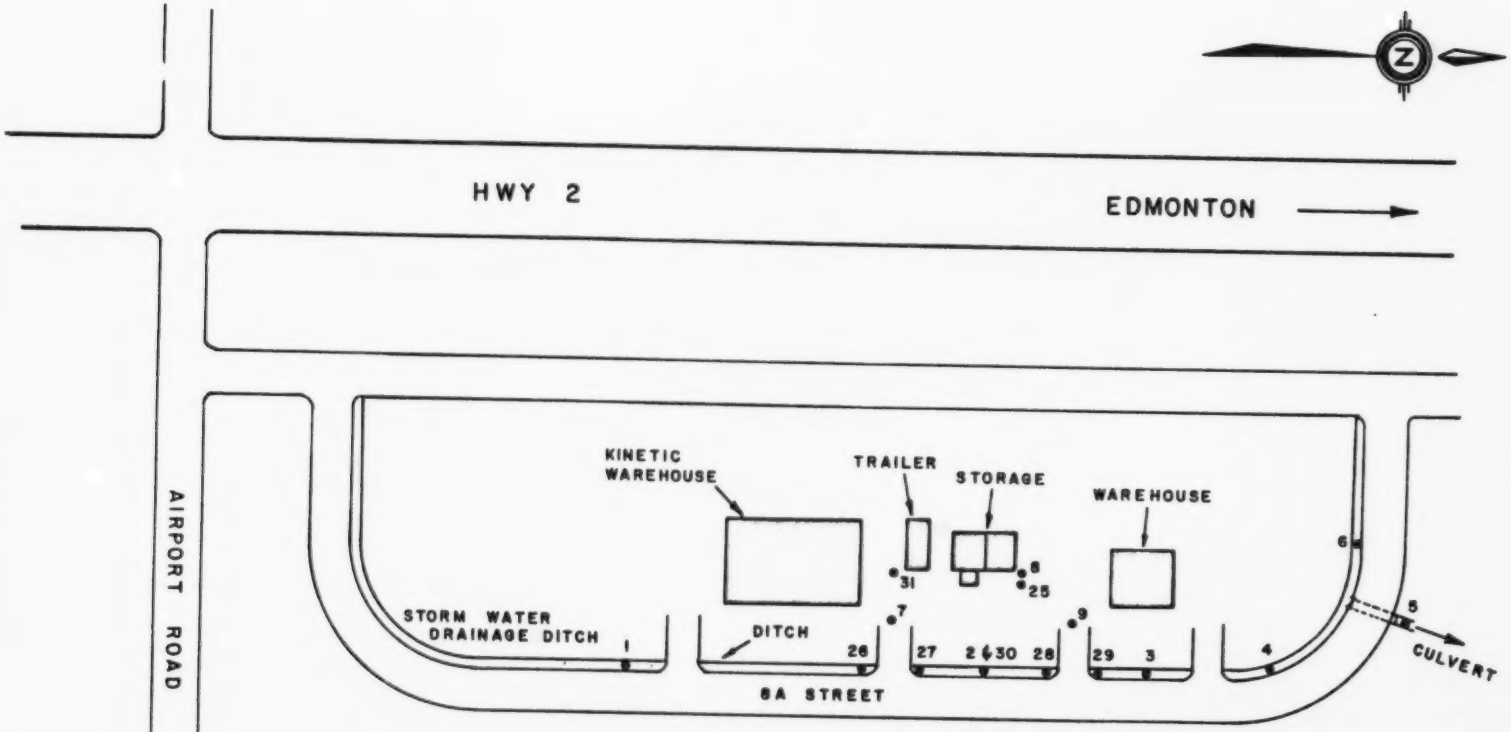


FIGURE I

SKETCH OF

PCB SAMPLING LOCATIONS

KINETIC ECOLOGICAL RESOURCE GROUP (1982) LTD.

NISKU INDUSTRIAL PARK

NOT TO SCALE

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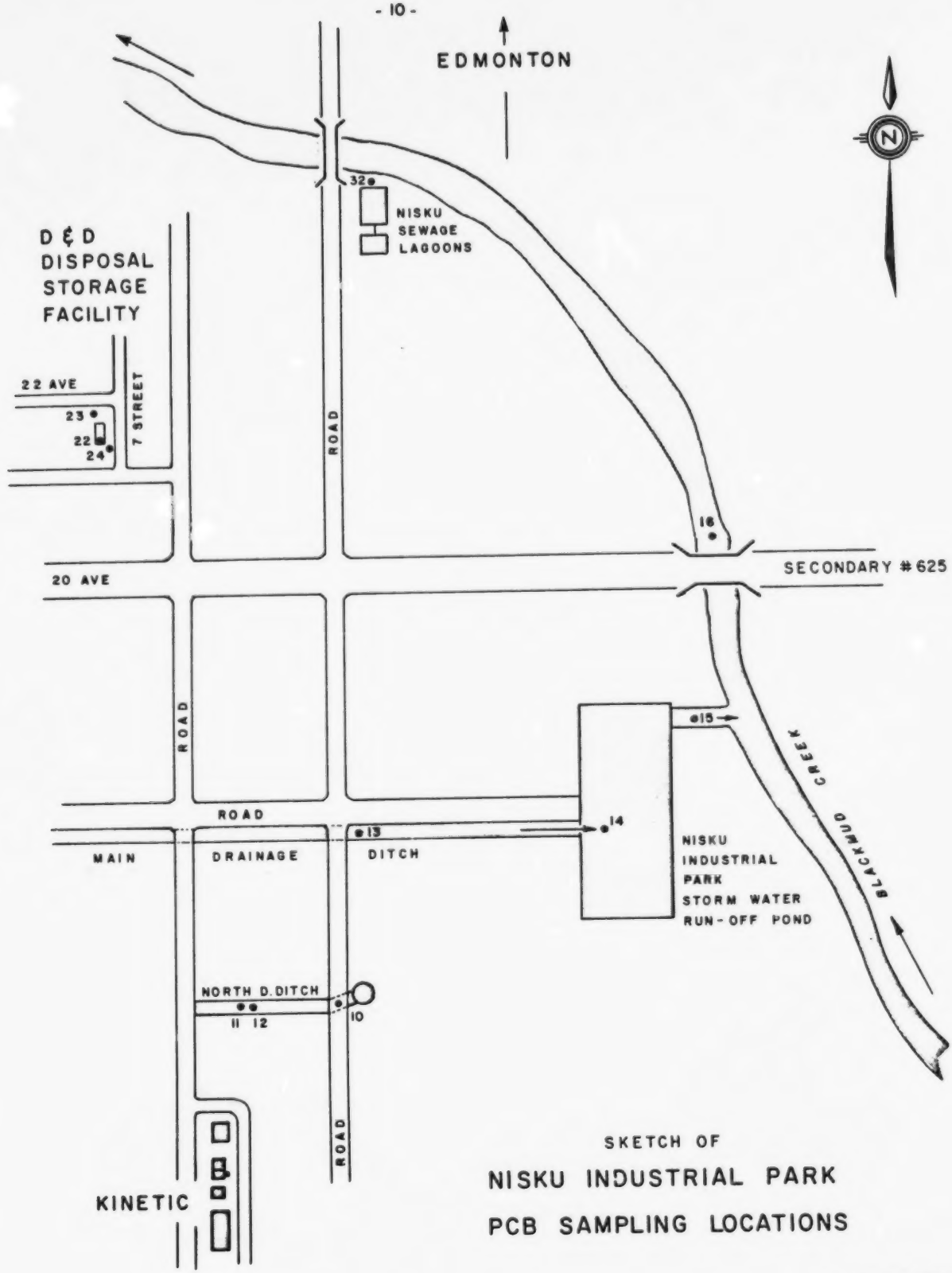

SKETCH OF

NISKU INDUSTRIAL PARK

PCB SAMPLING LOCATIONS

NOT TO SCALE

FIGURE II

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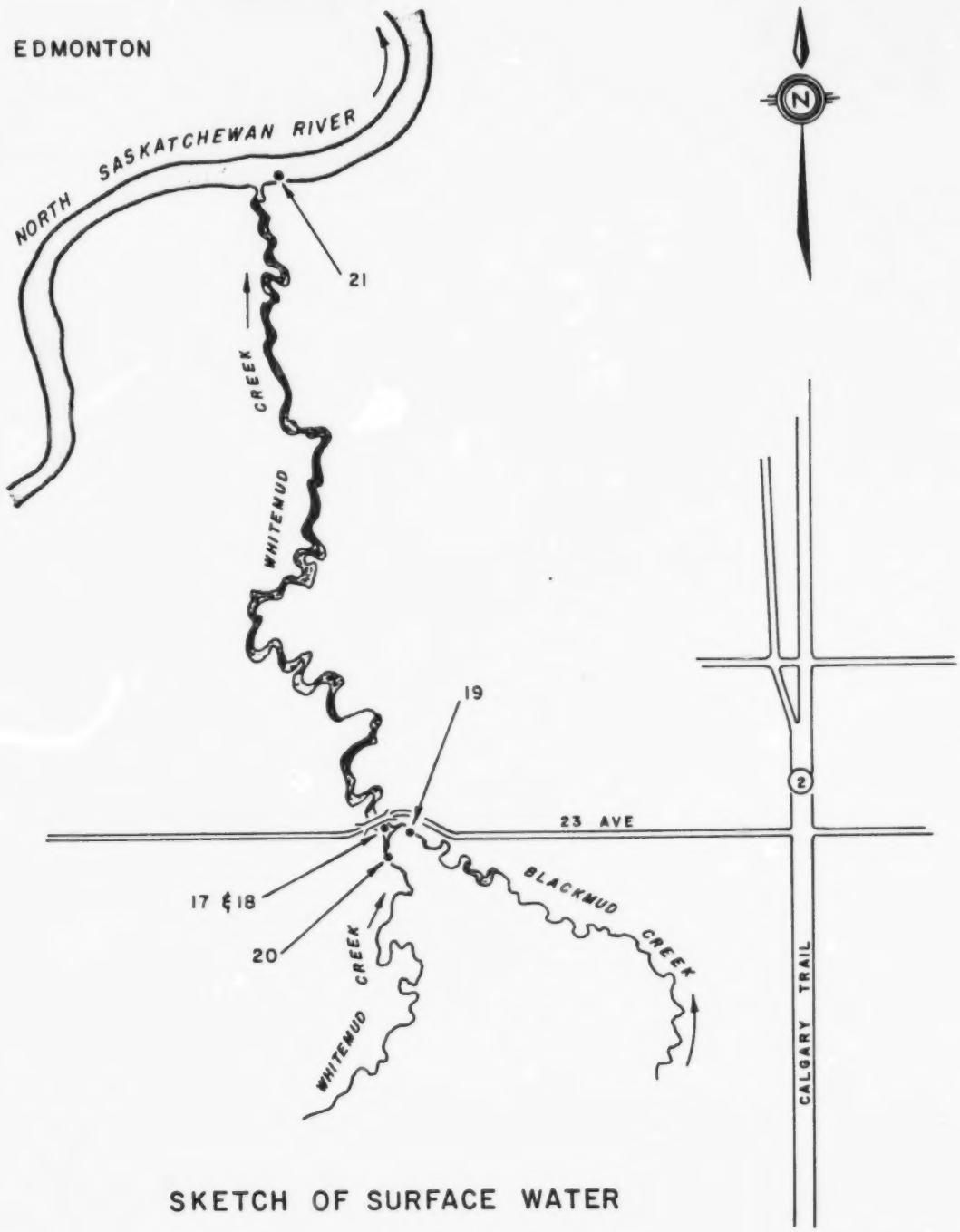

SKETCH OF SURFACE WATER

SAMPLING LOCATIONS

NOT TO SCALE

FIGURE III

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APPENDIX I - ENVIRONMENT CANADA REGULATIONS

REGULATIONS PRESCRIBING THE MAXIMUM QUANTITY AND CONCENTRATION OF CHLOROBIPHENYLS THAT MAY BE RELEASED

Short Title

1. These Regulations may be cited as the Chlorobiphenyl Regulations No. 3 (Release).

Interpretation

2. In these Regulations,

"Act" means the Environmental Contaminants Act;

"chlorobiphenyls" means those chlorobiphenyls that have the molecular formula $C_{12}H_{10-n}Cl_n$ in which "n" is greater than 2;

"electrical transformers" includes transformer/rectifier assemblies installed in a common enclosure;

"packaging" means any receptable or enveloping material used to contain or protect goods;

"release" includes spilling, leaking, pumping, spraying, pouring, emitting, emptying, throwing or dumping.

PRESCRIPTION

3(1) Subject to subsection (2), no person shall, after (effective date), in the course of a commercial, manufacturing, or processing activity, wilfully release, or permit the release of, chlorobiphenyls into the environment in Canada in a concentration exceeding 50 parts per million by weight.

(2) A person may release chlorobiphenyls into the environment in Canada in a quantity not exceeding one gram per day if:

(a) the chlorobiphenyls are used in the operation, servicing or maintenance of electrical transformers and associated electrical equipment manufactured in or imported into Canada before July 1, 1980;

(b) the chlorobiphenyls are used in the operation of electrical capacitors manufactured in or imported into Canada before July 1, 1980;

(c) the chlorobiphenyls are used in the operation, servicing or maintenance of electromagnets not used to handle food, feed or anything intended to be added to food or animal feed for any purpose whatsoever, that were designed to use chlorobiphenyls and were in use in Canada before September 1, 1977;

(d) the chlorobiphenyls are used in the operation of heat transfer equipment, hydraulic equipment, and vapour diffusion pumps that were designed to use chlorobiphenyls and were in use in Canada before September 1, 1977;

(e) the chlorobiphenyls are transferred from and into equipment prescribed in paragraphs 2(a), 2(b), 2(c) and 2(d) or from and into packaging;

(f) the equipment prescribed in paragraphs 2(a), 2(b), 2(c) and 2(d) containing chlorobiphenyls or packaging containing chlorobiphenyls is stored or transported; or

(g) the material containing chlorobiphenyls is applied to road surfaces.